



463L Pallet System

612-500



References



FORSCOM/ARNG 55-1, Unit Movement
Planning

FM 55-9, Unit Air Movement Planning



SCOPE OF LESSON



- **FEATURES AND ADVANTAGES**
- **3 ELEMENTS OF 463L CARGO SYSTEM**
- **INSPECTION AND STORAGE PROCEDURES**
- **PALLET RESTRICTIONS**
- **PALLET BUILD-UP**
- **MARKING AND DOCUMENTATION**
- **COMMON ERRORS**





463L Pallet System



- Proper restraint of cargo is important in an air movement due to the possibility of cargo shifting during flight.
- The 463L pallet system provides deploying units with the ability to consolidate loose cargo (bulk cargo) and efficiently move it on strategic airlift



FEATURES



- **ON-SITE LONG & SHORT TERM STORAGE OF EQUIPMENT / MATERIALS**
- **TRANSPORTABLE BY AIR & SURFACE MODES - MILITARY & COMMERCIAL**

ADVANTAGES

- **REDUCE AIRCRAFT LOAD AND OFFLOADING TIMES BY 75%**
- **UTILIZES AIRCRAFT MORE EFFICIENTLY WHEN TRANSPORTING BULK CARGO**

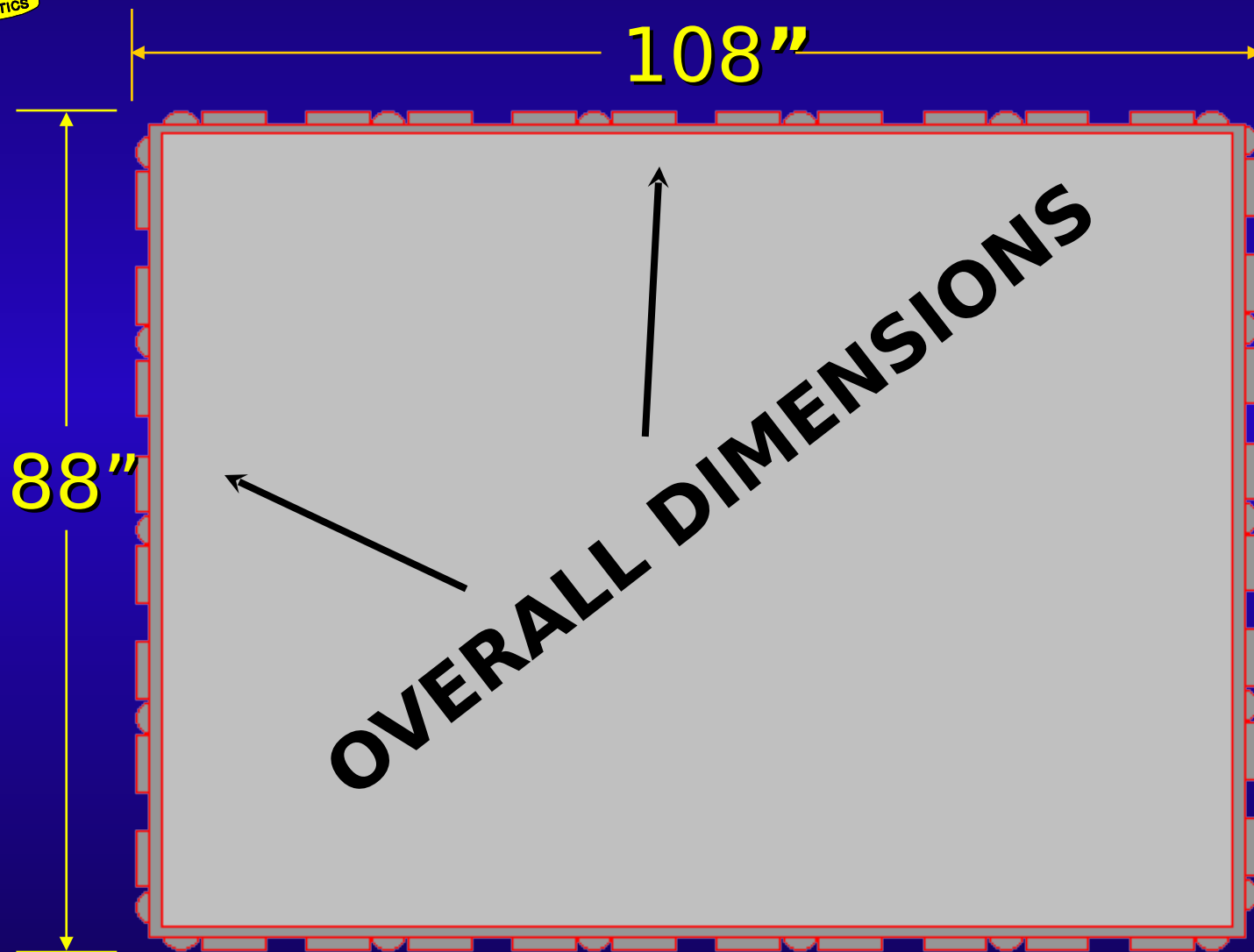


3 ELEMENTS OF 463L SYSTEM

- **463L PALLET & NET SET**
- **MATERIAL HANDLING EQUIPMENT**
- **AIRCRAFT ROLLERS AND RAILS**

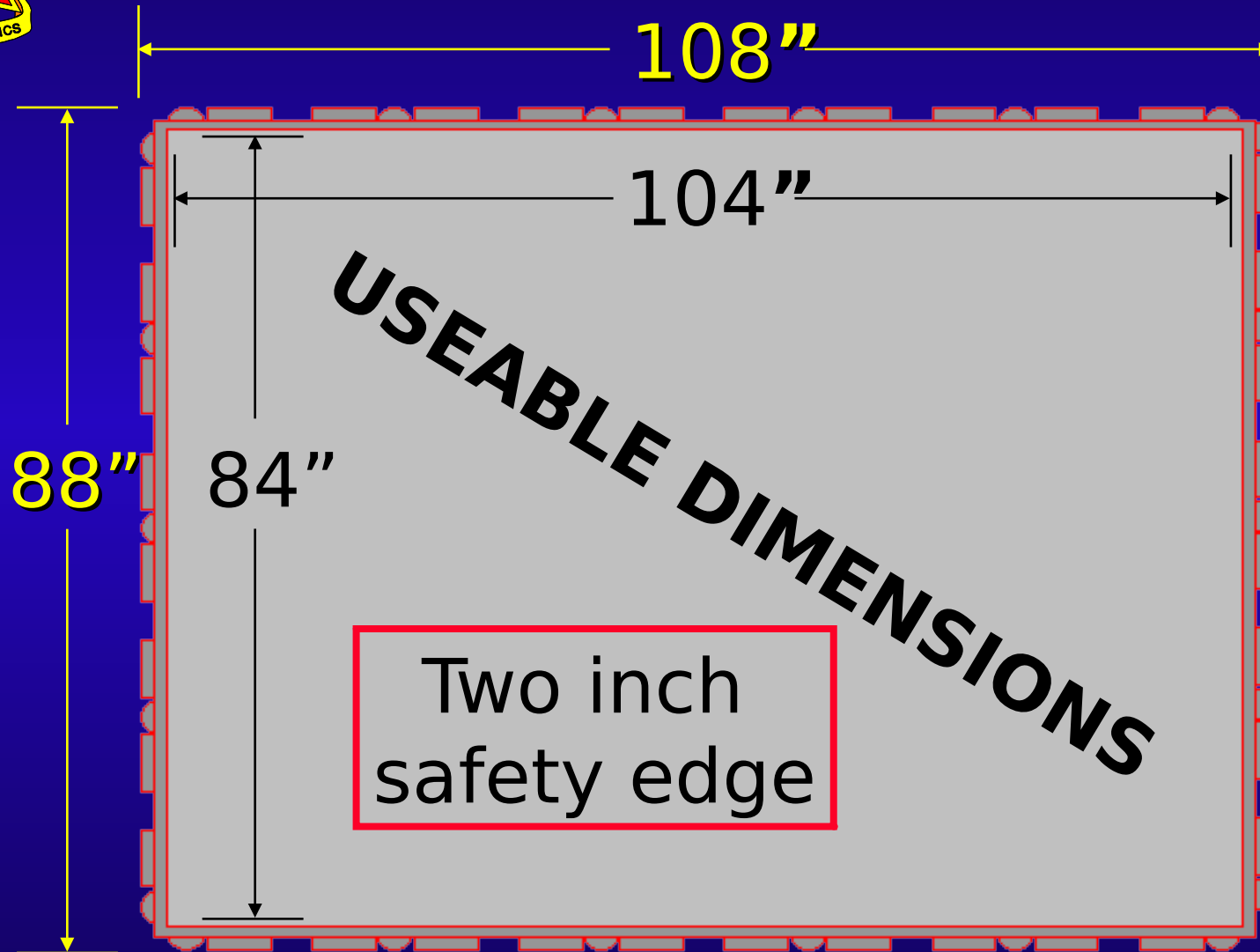


463L Pallet

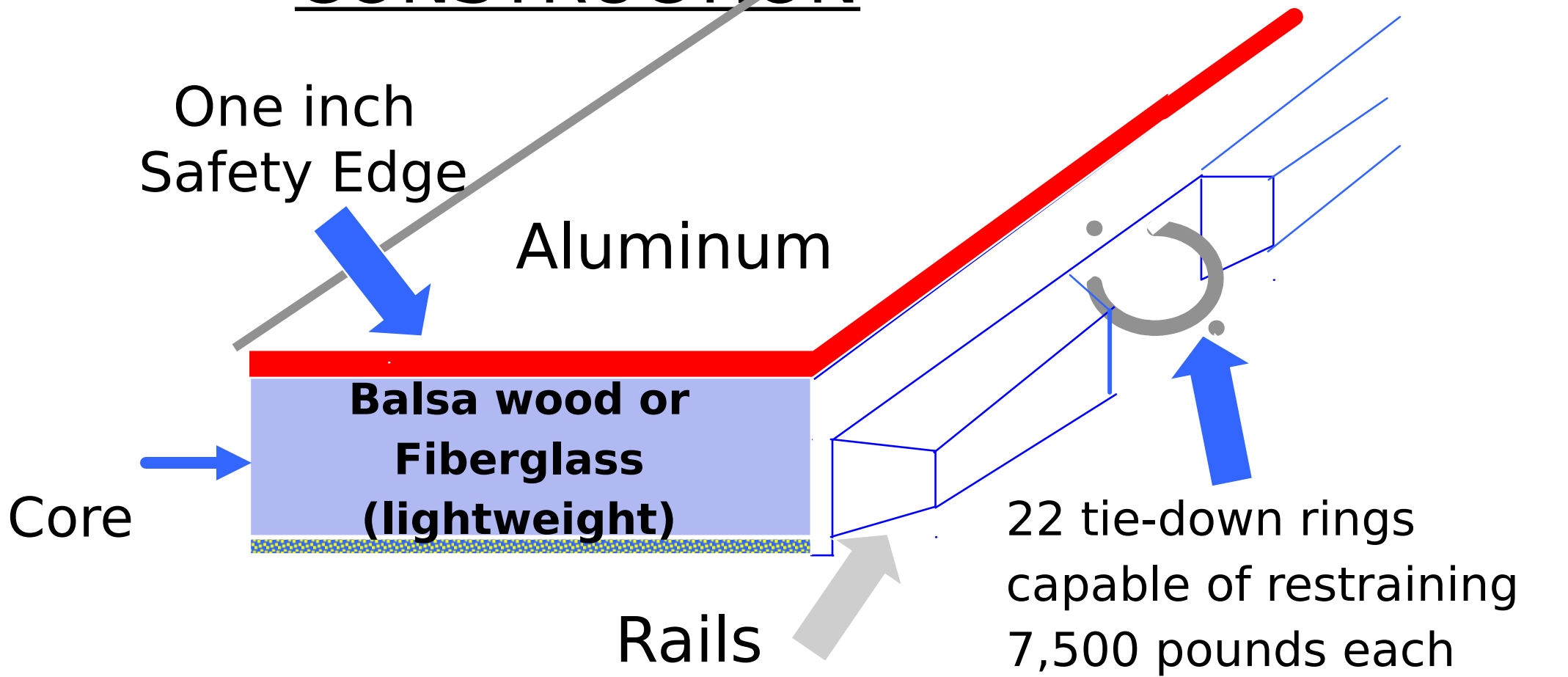




463L Pallet (Cont)



463L PALLET CONSTRUCTION



- Covering is 1/8-inch aluminum veneer sheeting, top and bottom
- Total pallet thickness is 2-1/4 inches
- Pallet empty weight is 290 pounds



NETS



- When all restraining nets are used the load capacity is 10,000 pounds
- Pallet can transport more than 10,000 pounds but load planning cannot exceed 250 pounds PSI
- Each net set consists of one top net (colored yellow) and two sides nets (colored green or black)
- Together the nets can restrain 10,000 pounds of cargo up to 96-inches high to a force of 3Gs



TOP NET



- Yellow in color
- Provides vertical restraint when used with side nets
- When used alone can restrain up to 2,500 pounds to a max height of 45 inches
- Pallet loads over 2,500 pounds require additional restraints



463L Pallet Nets -- Top net (Cont)



- The top net attaches by hooks to the rings on the side nets or, when used alone, to the tie-down rings on pallet.
- When a top net is used alone, the net band sewn closest to the hooks (referred to as belly band) must not be more than eight inches from the top of the pallet surface.

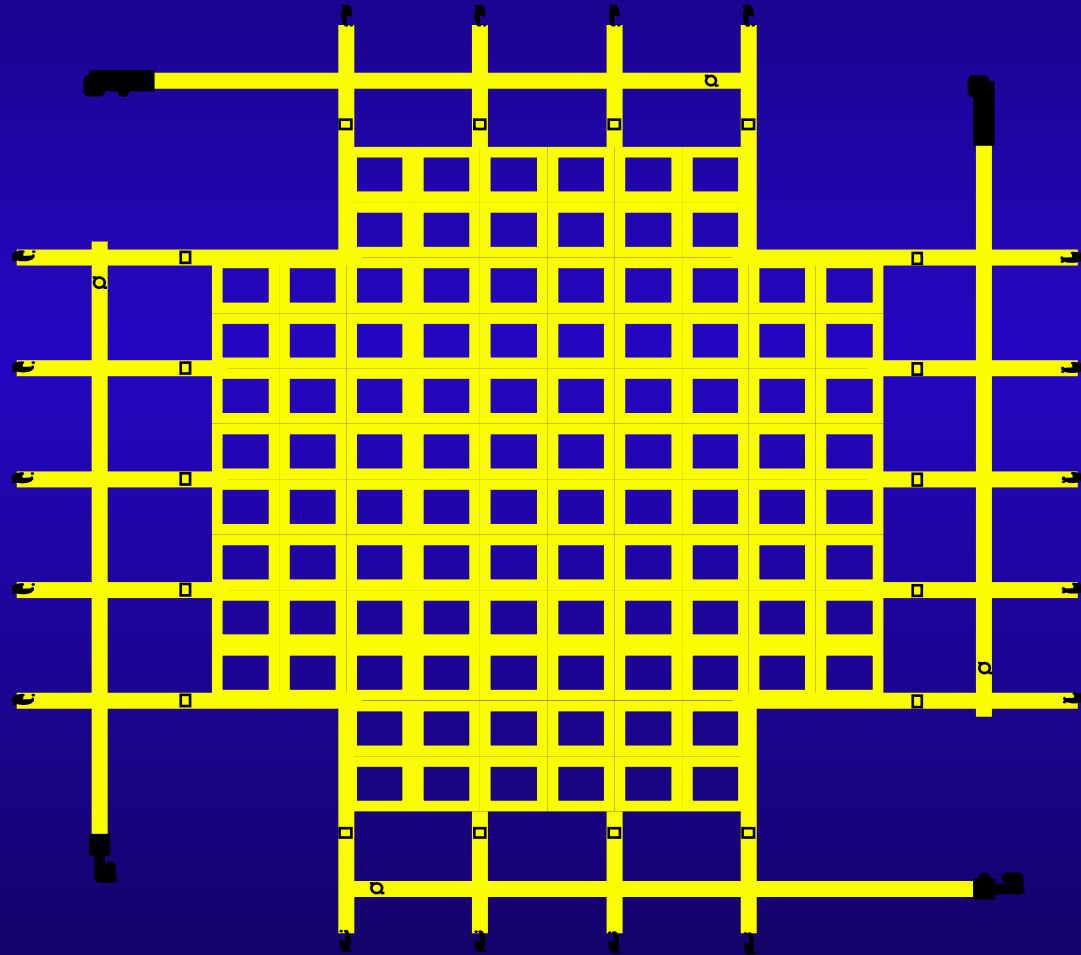


463L Pallet Nets

-- Top net



Top net





TOP NET LOAD





463L Pallet Nets -- Top net (Cont)

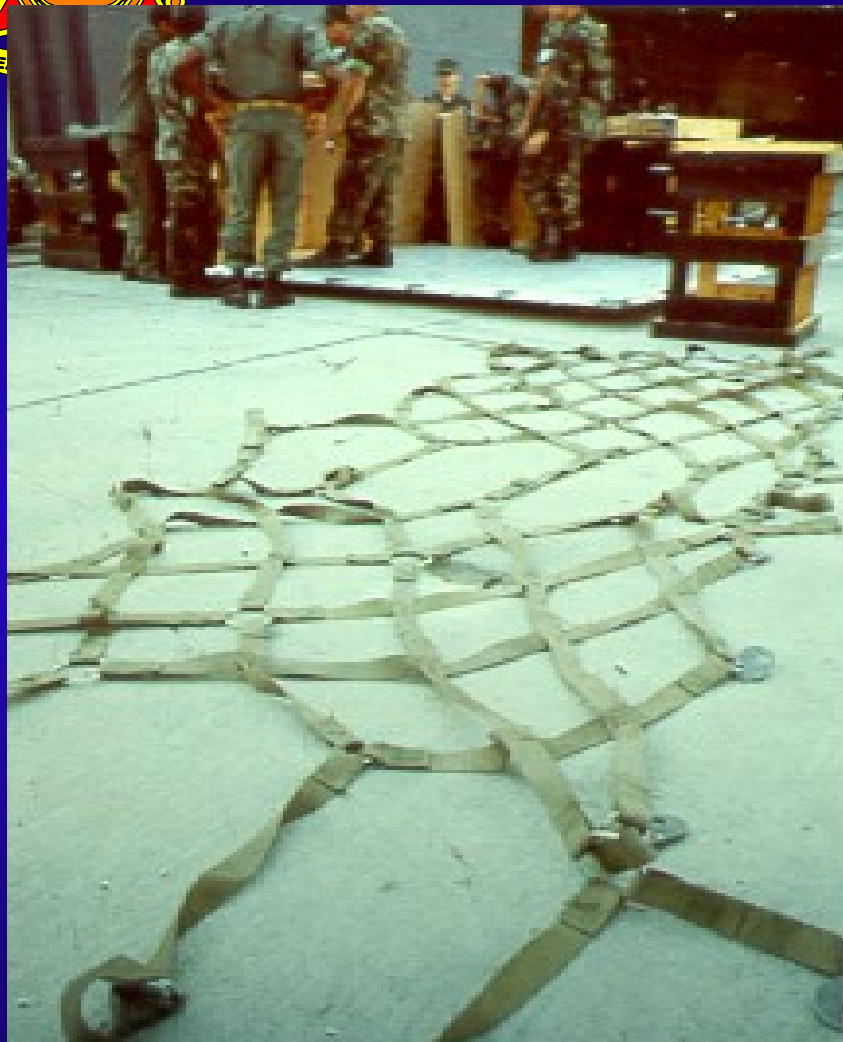


- The top net can be used alone or with additional straps to secure the load





SIDE NET



- Qty of two
- Green or black in color
- Provide forward, aft and lateral restraint



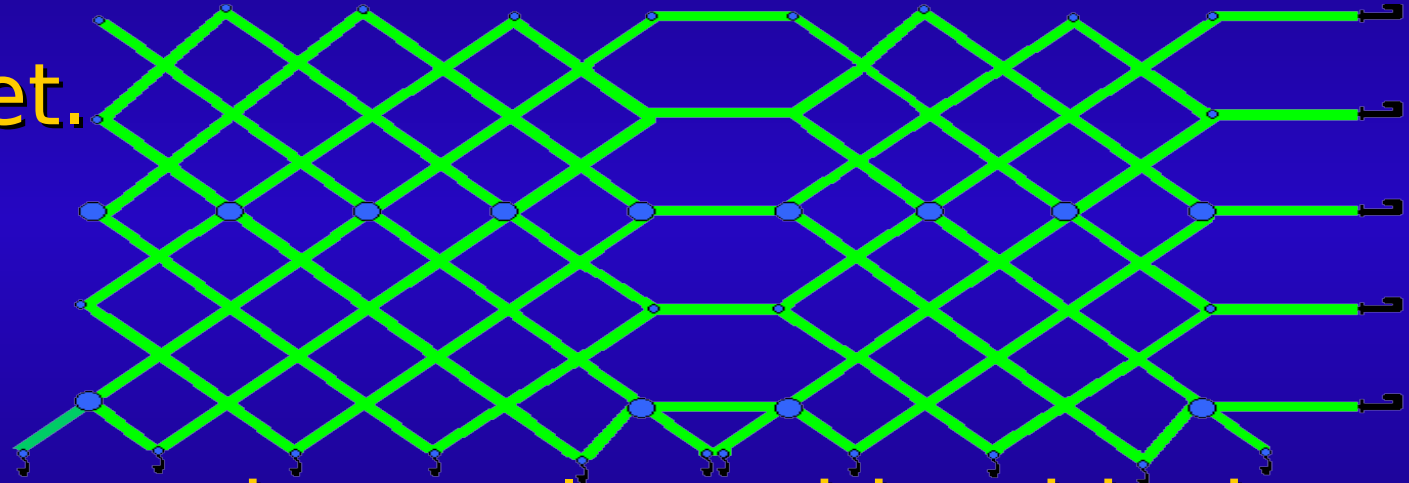
463L Pallet Nets

--Side Nets



- The side nets attach by hooks to the rings of the

463L pallet.
Side
nets (1
of 2)



- The side nets have a long side with six hooks and short side with five hooks to match the long and short sides of the 463L pallet.

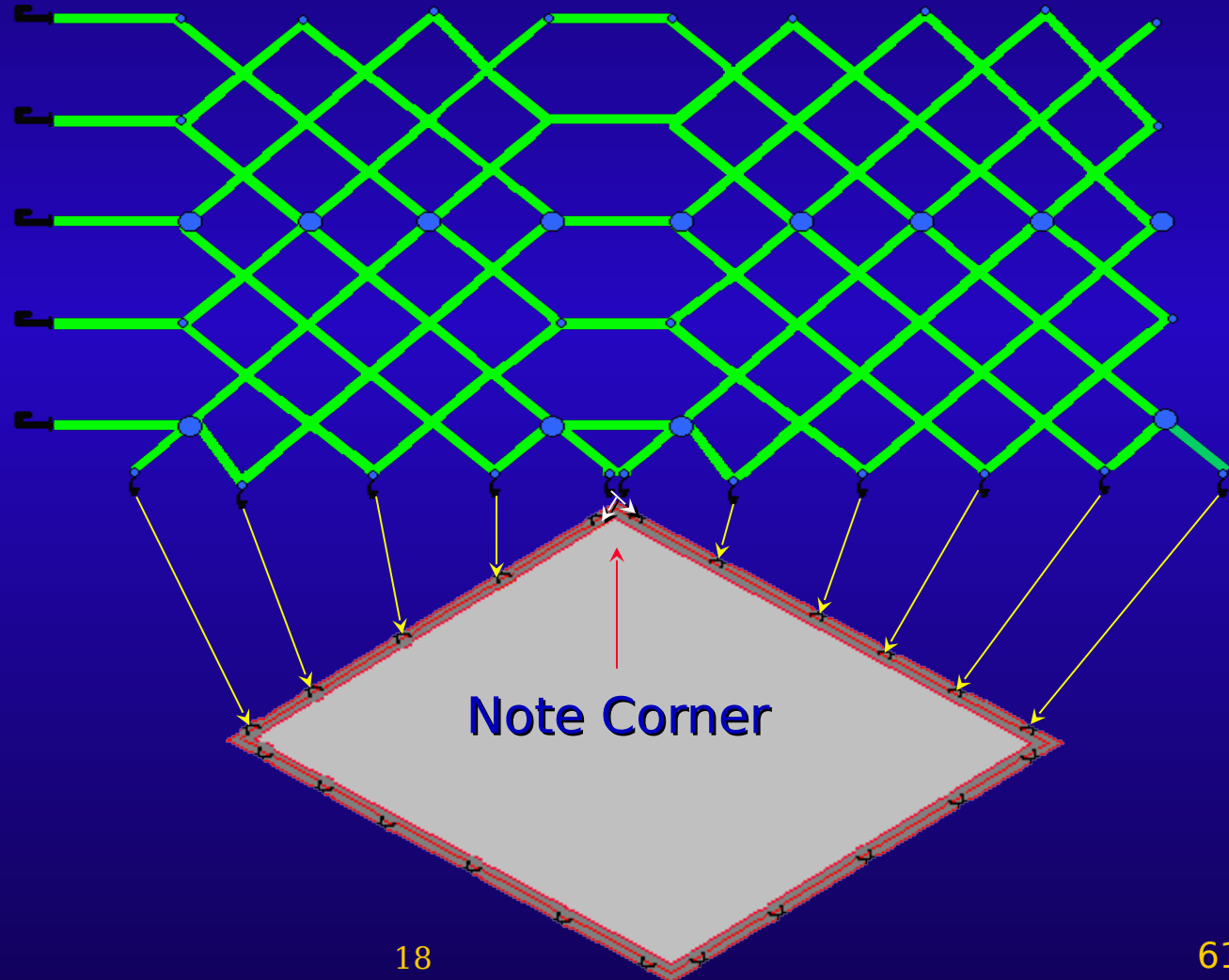


463L Pallet Nets

--Side Nets (Cont)



- Connecting the side net to the 463L pallet
- All hooks point to inside

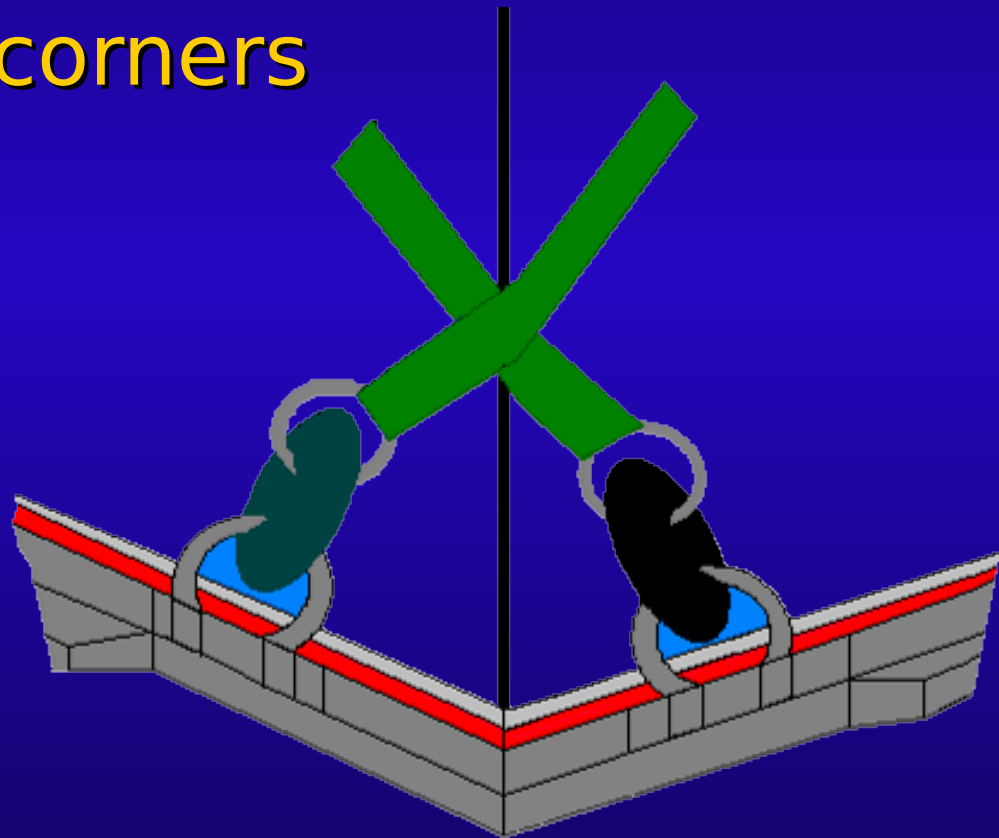




463L Pallet Nets --Side Nets (Cont)



Straps crossed at corners





SECOND ELEMENT 463L SYSTEM



MHE



MHE Availability



- You have a responsibility to provide MHE whenever possible
- Plan and coordinate for it at deployed locations
- If you need MHE support contact your affiliated TALCE





Forklifts Usage



- Forklifts are used to lift, transport, and stack cargo or equipment
- They aid in cargo build-up at the unit area, transporting cargo to the airfield, and aircraft loading





Forklifts Types



10K/13K A/T



10K Standard



6K R/T



4K



Forklifts Tine (Fork) Extenders



- Forklift tines must be at least 72" long for use with the 463L pallets



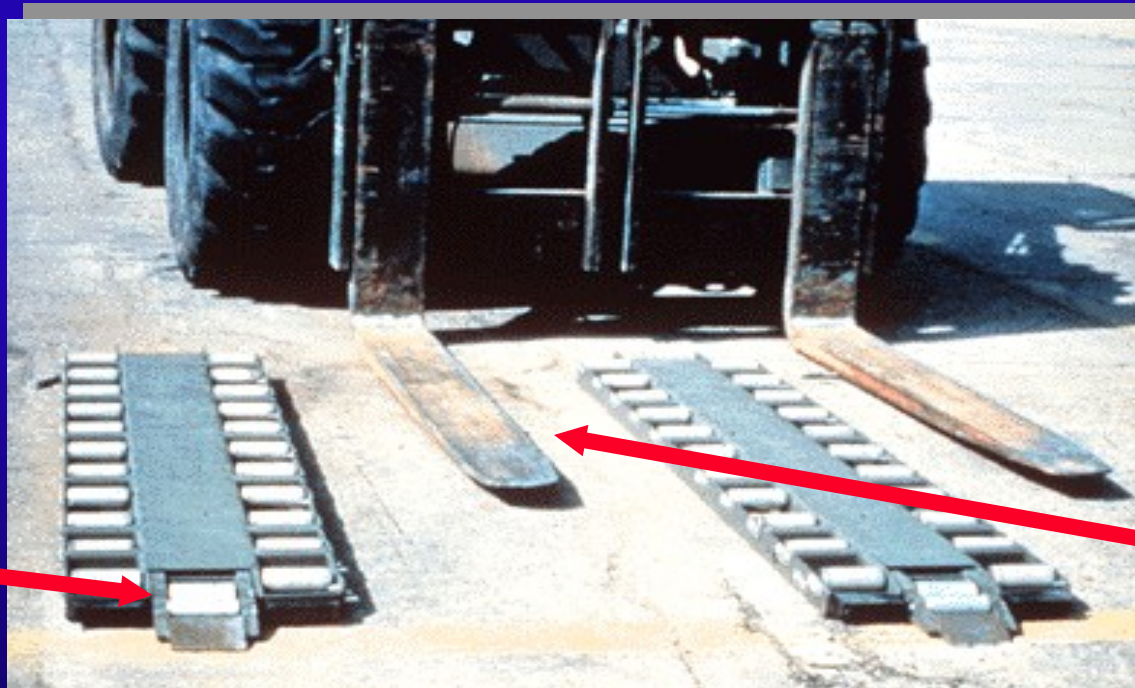
Tine Extenders



Forklifts Tine (Fork) Extenders (cont)



- Tine extenders provide additional length - designed in two configurations



Rollerized
Tines
Extenders
(easiest to use)

Bare
Tines
Extenders



Side View





K-Loaders



- K-loaders provide the capability to rapidly on and off load 463L pallets from airlift aircraft
- They're large and heavy, and may be difficult to transport
- Particularly useful for handling married pallets
- Early coordination with your affiliated TALCE is essential if your unit needs one



K-Loaders - Types



← 25K



← Halversen



K-Loaders - Types



← 40K

60K (Tunner) →



25K



Halversen



K-LOADERS



25K K-Loader and Halversen

- 3 x 463L pallets with a gross weight of 25,000 pounds
- air transportable or on flatbed trailer
- Equipped with roller for ease of on/offloading
- Hydraulically raised or lowered to desired height

40K K-Loader

- 5 x 463L pallets with a gross weight of 40,000 pounds
- Same features as 25 K-Loader



60K K-Loader

- 6 x 463L pallets with a gross weight of 60,000 pounds
- Same features as 25 K-Loader





Wide Body Loaders



- The 25K-Loader and 40K- Loader without bed extender will not reach the cargo floors on wide-body aircraft (B-747, DC-10 and KC-10)
- For wide body aircraft must use the 60K (Tunner), Halversen and the 40K with a bed extender
- Wide body aircraft do not have cargo loading ramp capabilities
- May use wide body loaders for these aircraft - elevator type loader, not used for horizontal transport (requires at least one 25K-loader and 6K forklift for loading)

Wide Body Loaders (cont)

**316A Cochran Loader
(shown)**

**(2 x 463L pallets to gross
weight of 25,000 pounds)**

**316E Cochran Loader
(3 x 463L pallets to a
gross weight of 40,000
p**



**CL-3 Wilson Loader
(3 x 463L pallets to a
gross weight of 40,000
pounds)**



Additional Loading Aids



- Rollerized Flatbed Trucks
 - Used when K-Loaders not available
 - Variety of sizes, lengths, and capacities
 - Rollerized flatbeds can help with speedy handling of palletized cargo
- Pallet Dollies
 - Equipped with swivel casters or rollers to aid in pallet movement
 - Have a tow bar and pintle hook for attaching to a towing vehicle or coupling the dollies into a train



Pallet Dolly





THIRD ELEMENT 463L SYSTEM

- **AIRCRAFT ROLLERS AND RAILS**
 - **USED TO LOAD AND SECURE 463L PALLETS INSIDE THE AIRCRAFT**



Aircraft Rails and Rollers



- C-130: permanently installed rails; rollers removable.
- C-141: rails hinged/foldable; rollers recessed into floor when not in use.
- C-5: Outboard rails permanently installed, inboard rails hinged/foldable; rollers recessed into floor when not in use.
- KC-10: rails and rollers permanently installed
- C-17: rails hinged/foldable; rollers recessed into floor when not in use.



ROLLERS INSIDE AIRCRAFT





PALLET LOADING





INSPECTION AND STORAGE PROCEDURES





463L Pallet Serviceability



- Inspect pallets for serviceability prior to use

Check both pallet sides for
fractures or warping
Tie-down rings must move

freely

Excessive corrosion makes pallet
unserviceable

Check for cleanliness. Pallet must
meet agricultural standards.

PALLET INSPECTION



Pallet damage

• Cleanliness





PALLET STORAGE



- Three point dunnage, 4" X 4" X 88" pieces of lumber
- Dunnage laid under base support pallet
- Dunnage between each set of 10 pallets
- May stack as many as 50 high
- When shipping pallets, you may stack the pallets 25 high. Place dunnage between base support pallet and then stack pallets. Restrain pallets with one set of



NET INSPECTION

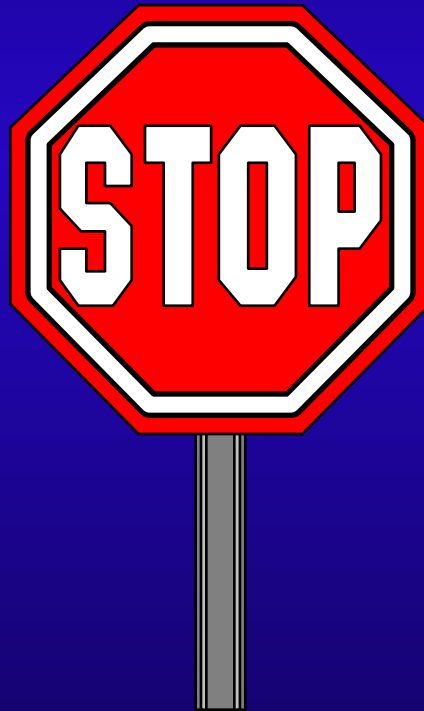


- Spread nets out on dry, clean surface and check for the following:

- Tears
- Loose or torn stitching
- Missing or broken straps, rings, buckles and hooks
- Dirt, grease, foreign objects, and mildew



PALLET RESTRICTIONS





463L Pallet Restrictions



- 463L pallets load restrictions prevent damage to cargo, 463L pallets and nets, and the aircraft.
- Ensure build-up pallets do not exceed the dimensional and load bearing capabilities of the aircraft.



463L Pallet

Restrictions --

Weight Maximums



- Maximum weight capacity is 10,000 lbs
- Maximum load of 250 pounds for any given square inch
- Tie-down ring load must not exceed 7,500 pounds
- If top net alone is used to restrain cargo, the cargo load capacity is 2,500 lbs



463L Pallet

Restrictions -- Height

Maximums

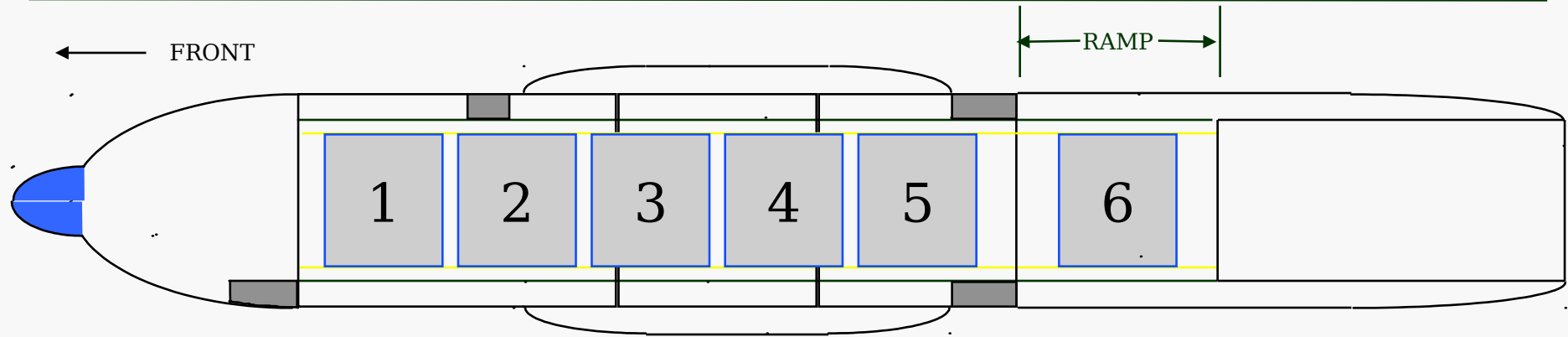


- Height maximums for built-up 463L pallets relate to the weight of the cargo load.
- With cargo load of 10,000 lbs - the height will not exceed 96 inches
- With cargo load of 8,000 lbs or less - the height will not exceed 100 inches
- When only the top net is used, the height is limited to 45 inches, and weight to 2,500 pounds

AIRCRAFT PALLET RESTRICTIONS

C-130 series

TOTAL 463L PLTS = 6

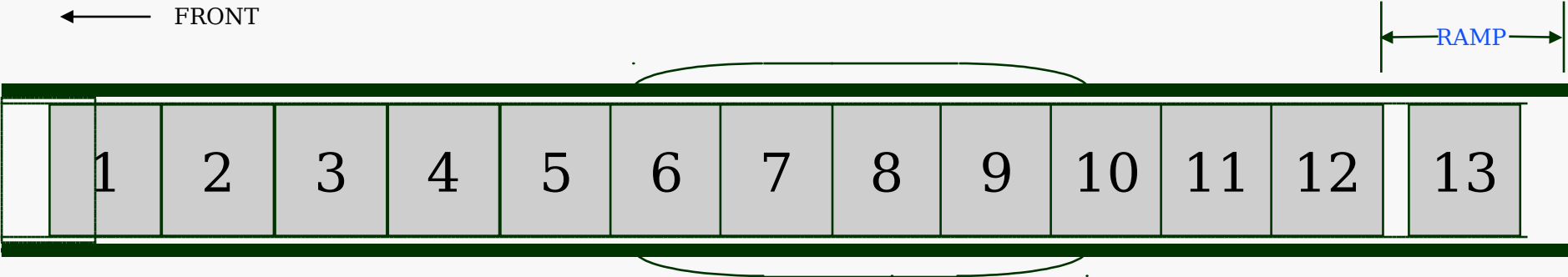


| PALLET POSITION (PP) | WEIGHT (POUNDS) | HEIGHT (INCHES) | RESTRICTIONS |
|---------------------------------|----------------------------|----------------------------|---|
| 1-4 | 10,355 | 96 | PP 3-4 Requires a 6" aisle on the left short side |
| 5 | 8,500 | 96 | |
| 6 | 4,664 | 76 | PP 6 Requires a 18" aisle on the left short side |

AIRCRAFT PALLET RESTRICTIONS

C-141 series

TOTAL 463L PLTS = 13

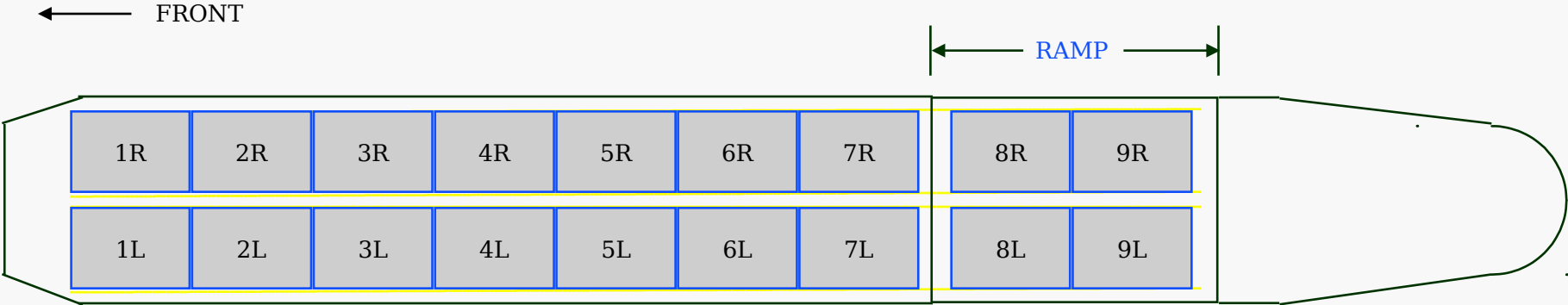


| PALLET POSITION (PP) | WEIGHT (POUNDS) | HEIGHT (INCHES) | RESTRICTIONS |
|-------------------------|--------------------|--------------------|--------------------|
| 1 | 10,355 | 76 | No aisles required |
| 2-12 | 10,355 | 96 | |
| 13 | 7,500 | 76 | |

AIRCRAFT PALLET RESTRICTIONS

C-17 series

TOTAL 463L PLTS = 18



| PALLET POSITION (PP) | WEIGHT (POUNDS) | HEIGHT (INCHES) | RESTRICTIONS |
|---|--------------------|--------------------|---|
| 1R-9R | 10,355 | 96 | PP 8-9 Left & Right can not exceed a combined weight of 40,000 lbs |
| 1L-9L | 10,355 | 96 | |
| ALL 463L PALLETS MUST BE ROTATED 90 DEGREES WHILE LOADING/UNLOADING FOR THIS CONFIGURATION | | | |

AIRCRAFT PALLET RESTRICTIONS

C-5 series

TOTAL 463L PLTS = 36

← FRONT

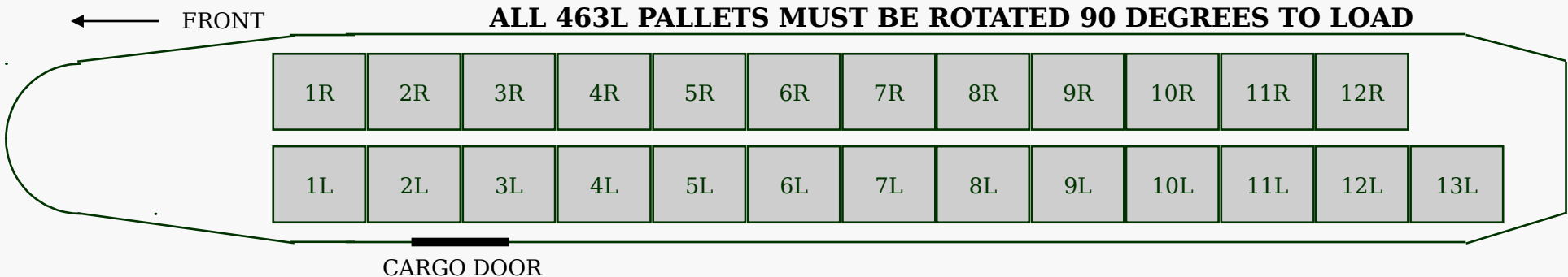
| | | | | | | | | | | | | | | | | | |
|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 3 | 5 | 7 | 9 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 25 | 27 | 29 | 31 | 33 | 35 |
| 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 |

| PALLET POSITION (PP) | WEIGHT (POUNDS) | HEIGHT (INCHES) | RESTRICTIONS |
|-------------------------|--------------------|--------------------|---|
| 1-2 | 7,500 | 96 | PP 1-2 Requires a 14" aisle on the outer edge of the short side |
| 3-34 | 10,355 | 96 | |
| 35-36 | 7,500 | 70 | PP 35-36 Requires a 14" aisle on the outer edge of the short side |

AIRCRAFT PALLET RESTRICTIONS

KC-10 series

TOTAL 463L PLTS = 25



| PALLET POSITION (PP) | WEIGHT (POUNDS) | HEIGHT (INCHES) | RESTRICTIONS |
|---------------------------------|----------------------------|----------------------------|---------------------|
| 1-6 L&R | 6,500 | *96 | *Pallet Contour "C" |
| 7-10 L&R | 10,000 | *96 | *Pallet Contour "C" |
| 11 L&R | 10,000 | *96 | *Pallet Contour "D" |
| 12 L&R | 6,500 | *88 | *Pallet Contour "D" |
| 13 L | 6,500 | *85 | *Pallet Contour "E" |

- NOTES 1. Pallet position 13L is not offered for user cargo.
2. All weights include weight of cargo, pallets and nets or other tiedown devices.



PALLET BUILDUP



PALLET BUILD-UP



- Cargo Selection
 - * Determine what cargo needs to be palletized
 - * Identify hazardous cargo
- Placement of Cargo
 - * Load cargo from heaviest to lightest
 - * Pallet center of balance
 - * Large heavy items evenly positioned from center of pallet outward
 - * Place hazardous cargo so markings are accessible
 - * Build up dimensions and gross weight must be within limits for pallet position within aircraft type



Building a 463L Pallet



- Place the pallet on dunnage before beginning the build-up.



Pallet Cargo Placement

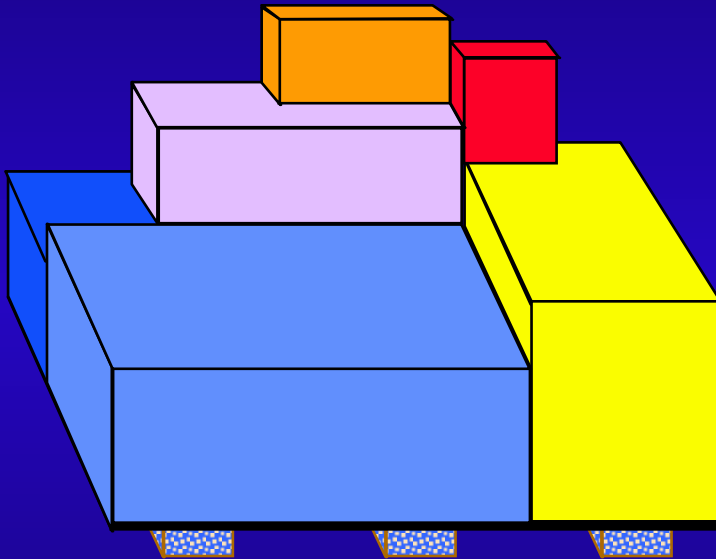


- Properly building a load on a 463L pallet contributes to the safe air movement of the cargo
- Place cargo items in square or pyramid shape when building pallet

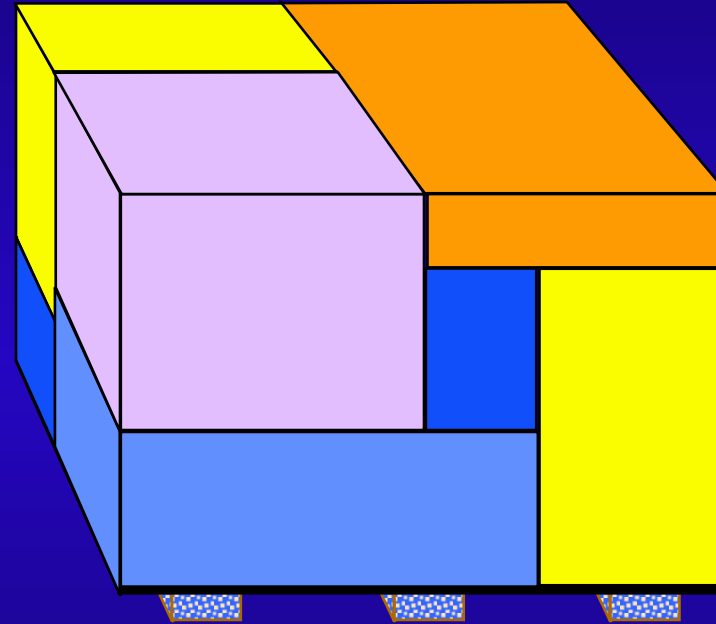




463L PALLET BUILDUP



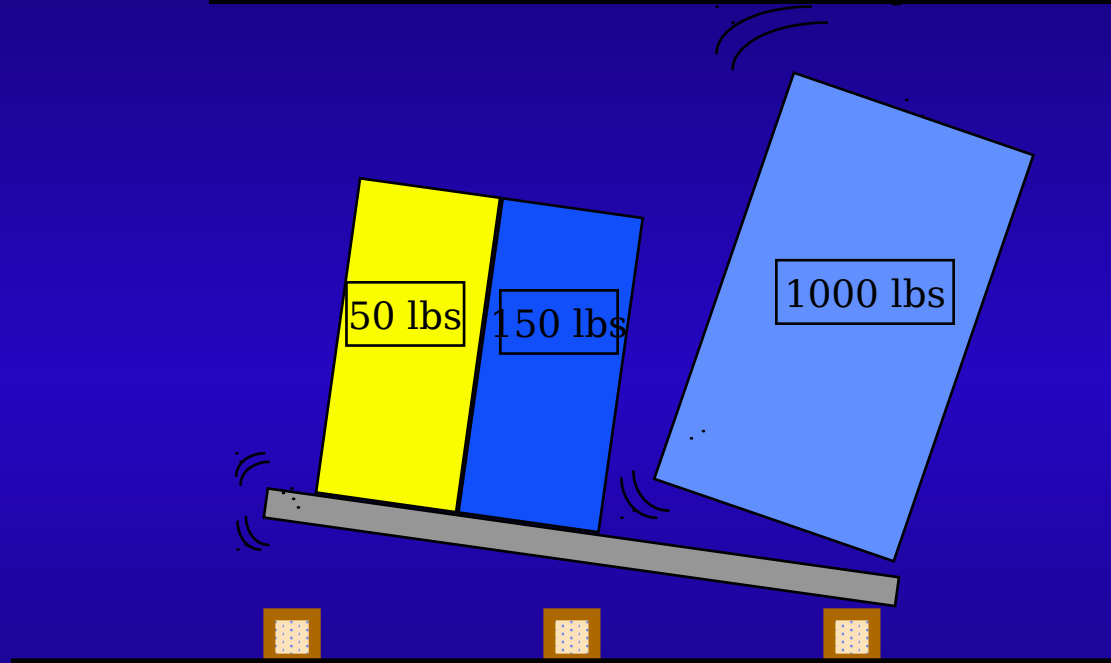
Pyramid



Square



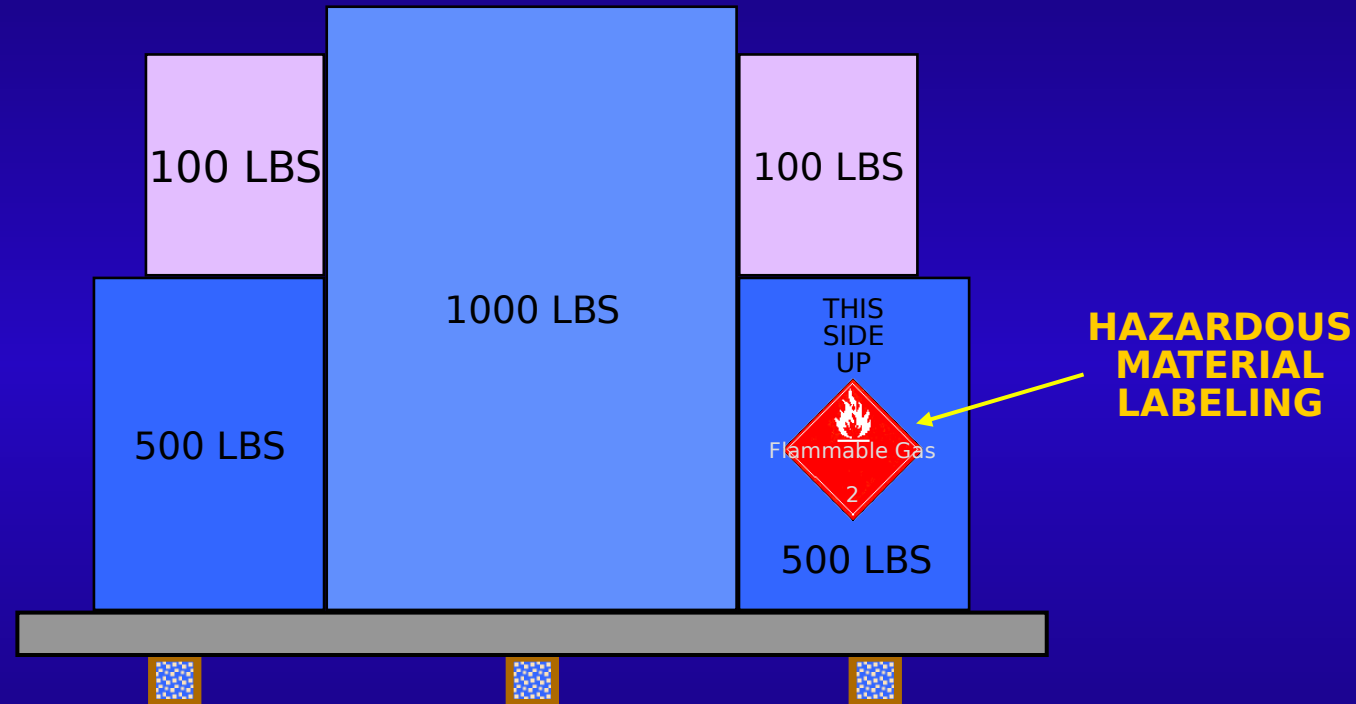
Pallet Cargo Placement (Cont)



Heavy Ended Pallet



Pallet Cargo Placement (Cont)



Correct placement of cargo & labeling
of hazardous materials



Pallet Cargo Placement (Cont)



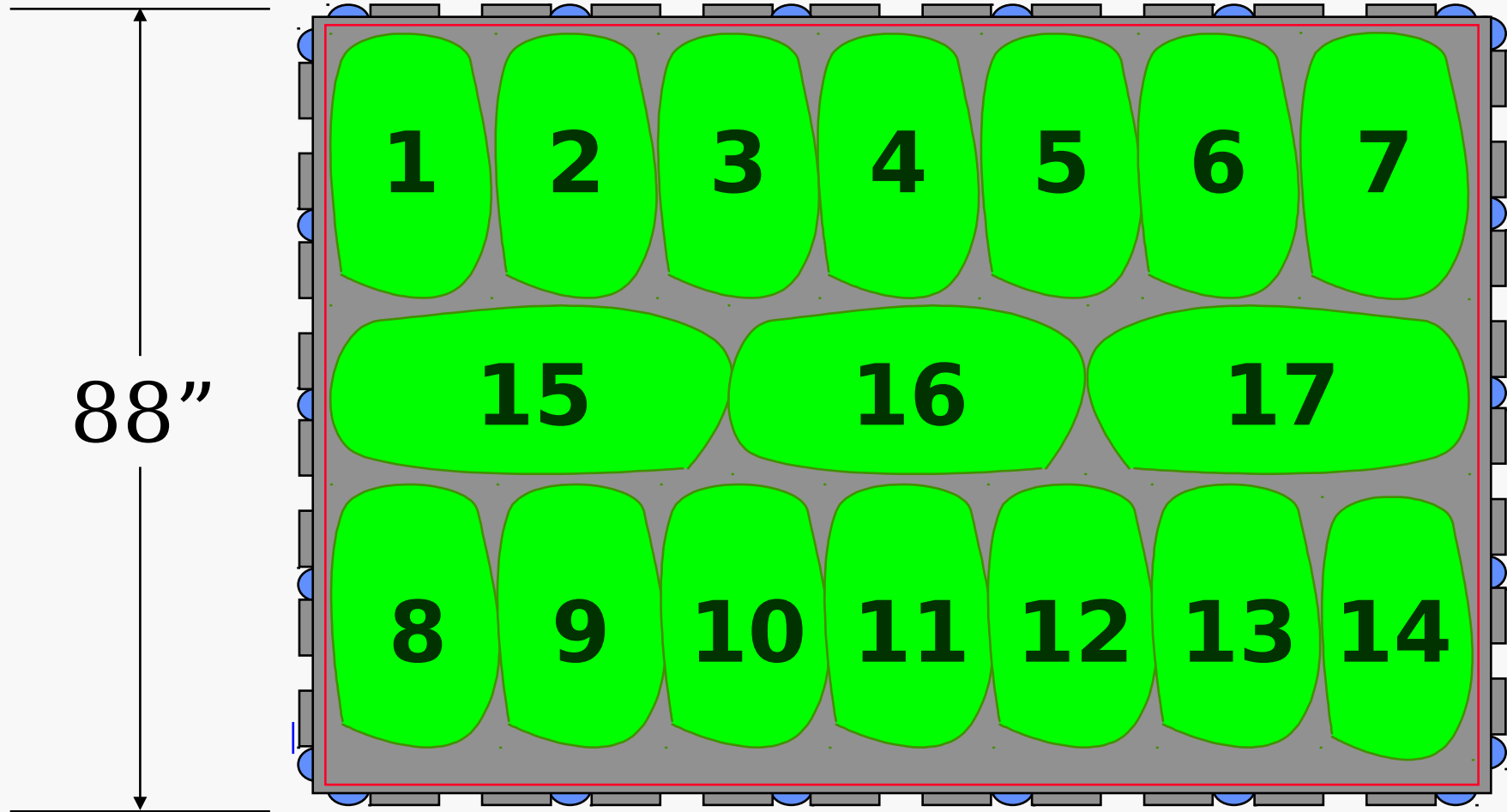
28 - inch



24 - inch

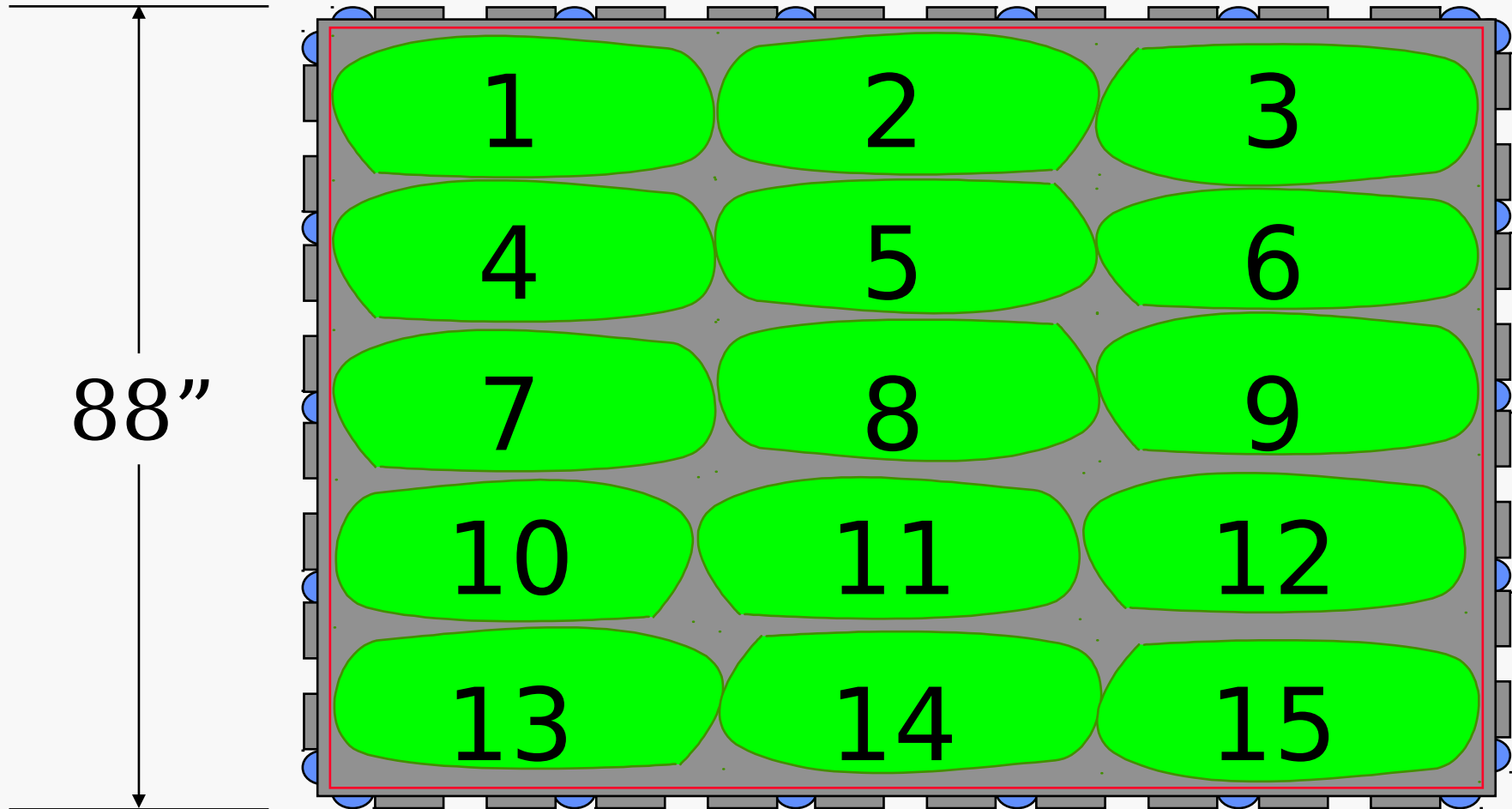
Load C/B must fall within a
24-inch by 28-inch rectangle
on the pallet center

463L PALLET BUILDUP



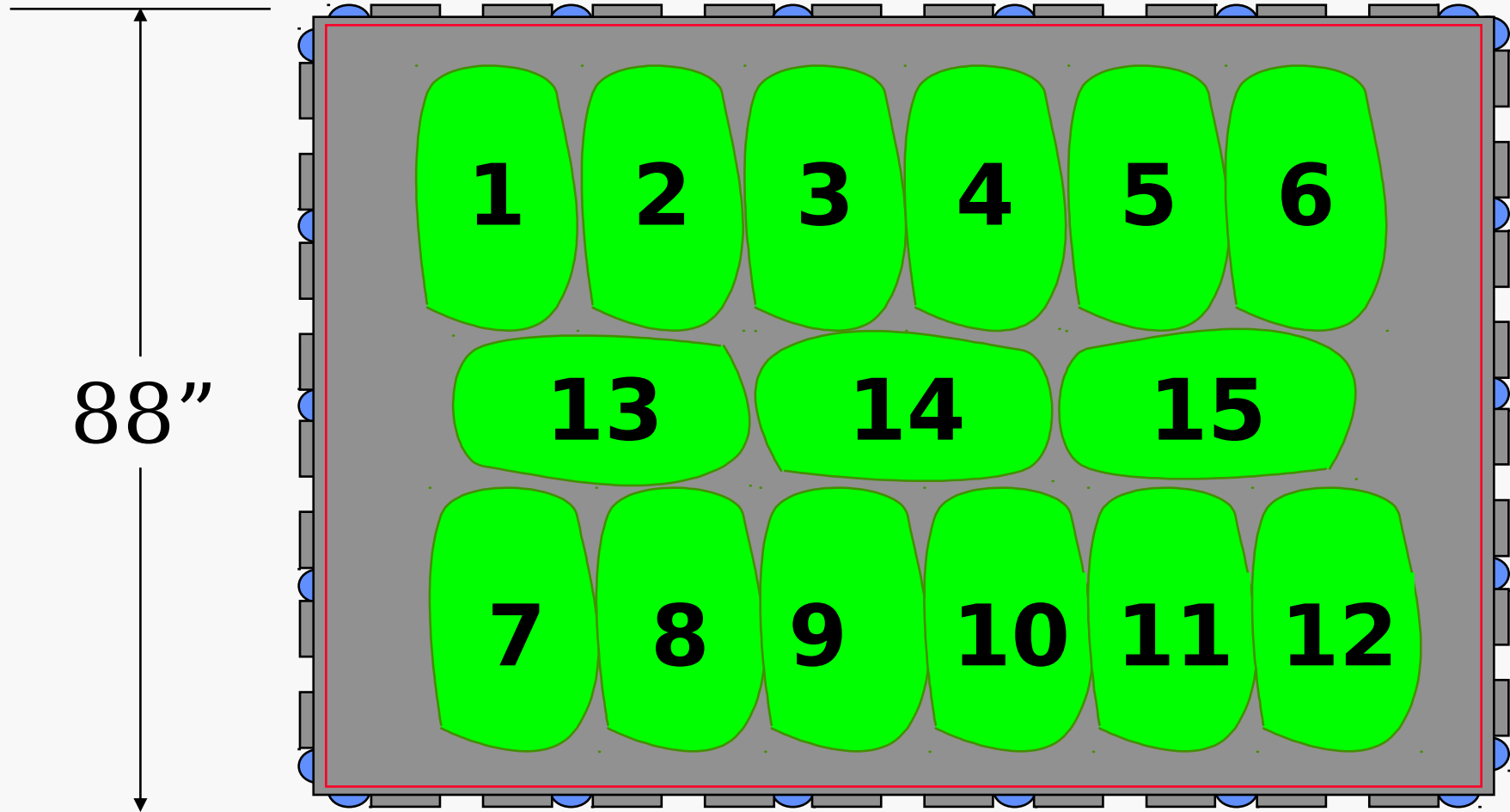
Baggage Placement: Row A - 17 Duffel Bags

463L PALLET BUILDUP



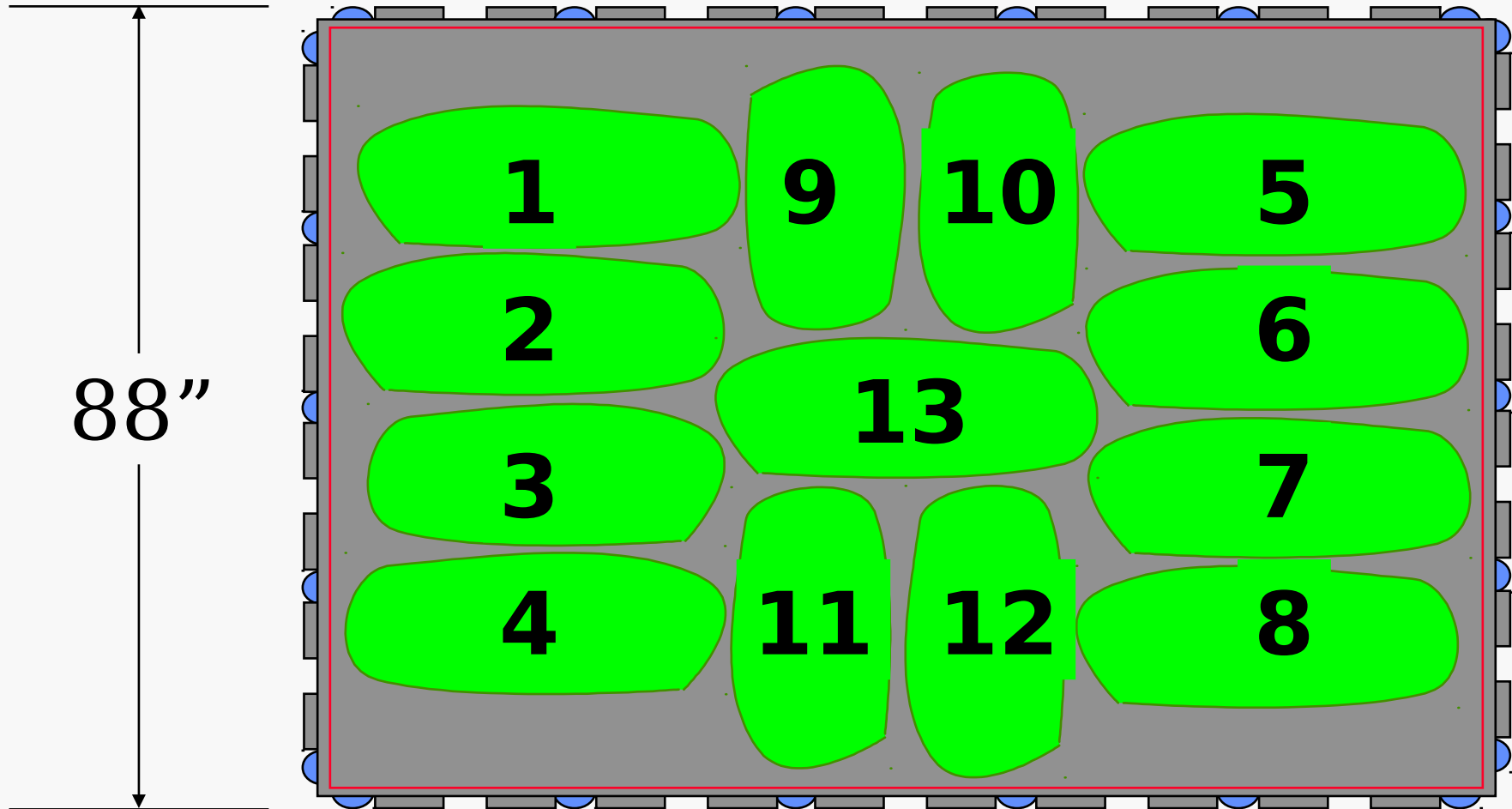
Baggage Placement: Row B - 15 Duffel Bags

463L PALLET BUILDUP



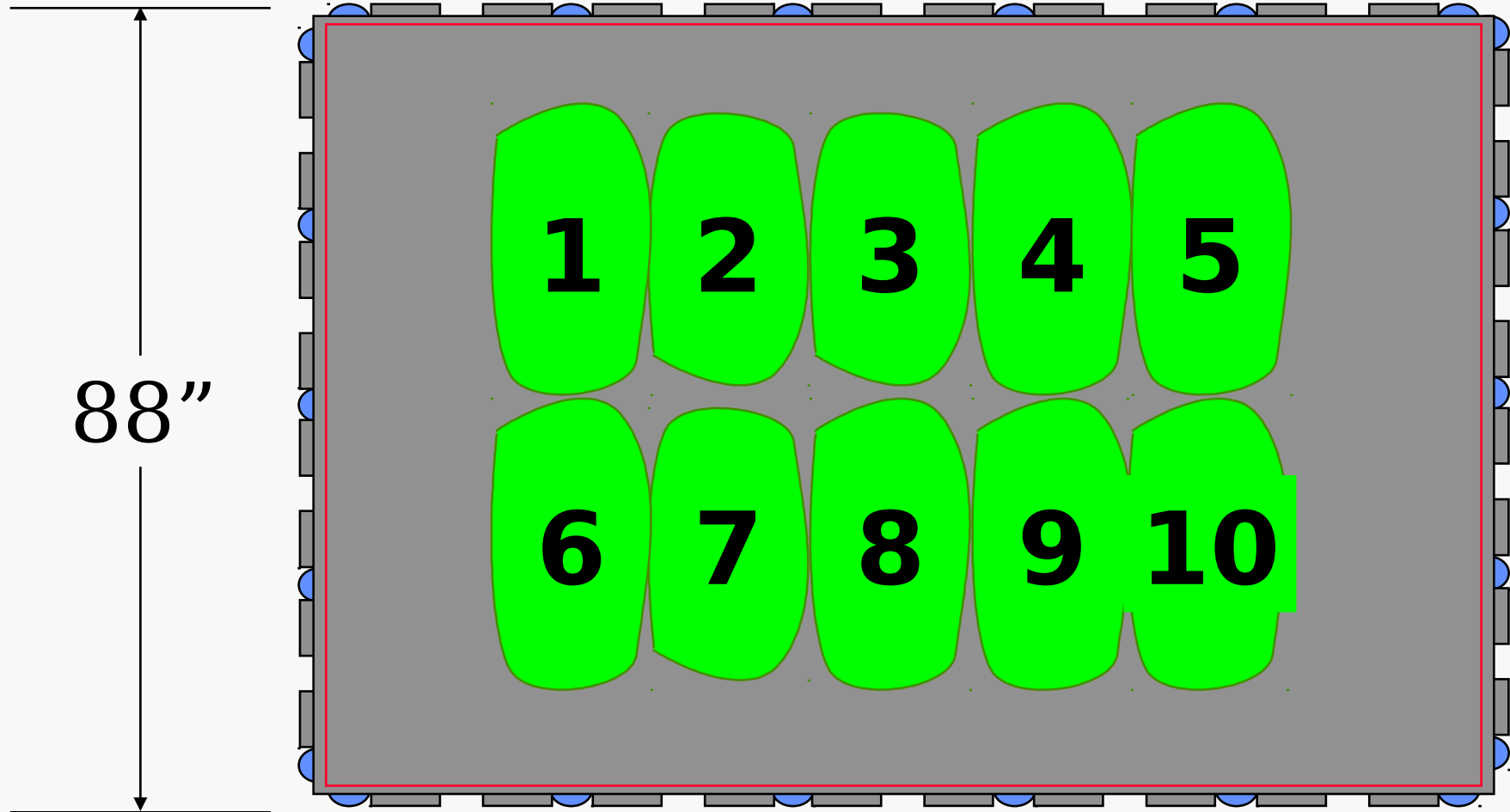
Baggage Placement: Row C - 15 Duffel Bags

463L PALLET BUILDUP



Baggage Placement: Row D - 13 Duffel Bags

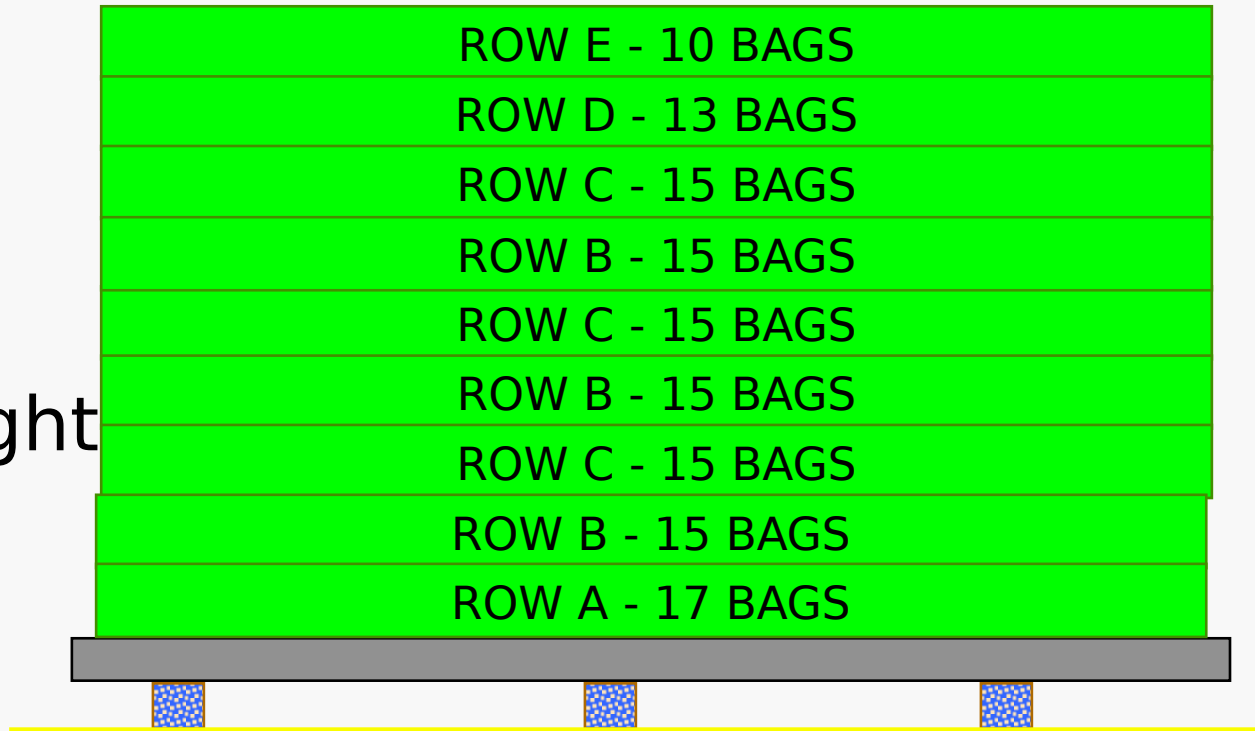
463L PALLET BUILDUP



Baggage Placement: Row E - 10 Duffel Bags

463L PALLET BUILDUP

Alternate
Rows B & C
until the
desired height
is obtained.



Baggage Placement: Maximum 130 Duffel Bags



Tie-down Equipment



- Tie-down equipment is essential to ensure the cargo is secured during flight.

Nets

CGU-LB Nylon
Strap

MB-1 Tie-down chain MB-1 Tension Device

MB-2 Tie-down chain MB-2 Tension Device



Other 463L Pallet



- Pallet covers Equipment
 - Use plastic for water sensitive or absorbent items
 - Short term use only
- Pallet Coupler
 - Ties two or more pallets together
 - Used for long loads



Tie-down Techniques



- Tie-down techniques vary according to the items to be secured
 - The barrier and chain techniques
 - + Palletized vehicles and large heavy items are chained to pallet
 - 5,000 pound tie-down straps



PALLETIZED CONTAINERS





Net Installation



- Nets are used to secure multiple loose items fit within the useable dimensions (84 by 104 inches) of a single 463L pallet.
 - Start at one corner and work around the pallet with side nets
 - Pull the nets as high as they will go and hook the two side nets together.
 - Center the top net over the cargo



Net Installation (Con't)



- Hook the top net into the side nets using the O-rings located on the top portion of the side nets for a tall load, or the O-rings located halfway down the side nets for a shorter load.
- Pull evenly on all straps opposite each other to tighten the top net.
- Tuck the loose ends of all straps into the net to prevent snagging during loading or unloading.



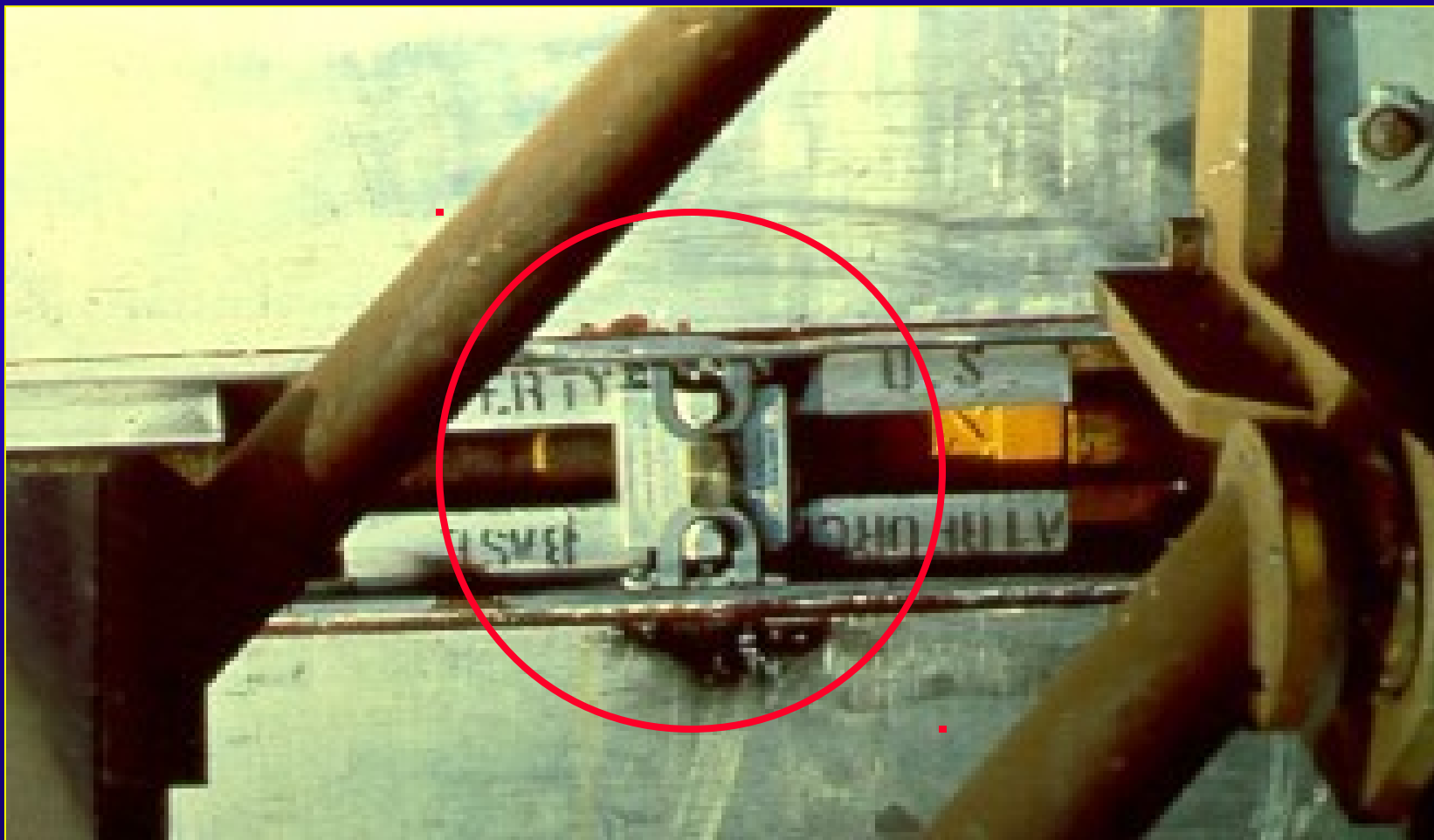
Married Pallets



- Married pallets:
 - Used for cargo that exceeds length of a single pallet.
 - Formed by joining two or more 463L pallets.
 - Pallet couplers are placed in the indents along the aligned pallet sides to lock the pallets together.



Married Pallets Example





Married Pallets (Con't)



- Married pallets become a rigid structure after are locked into the 463L rails on the aircraft.
Pallets must be kept level during loading/unloading
- Married pallets should be constructed on high-liner docks or other platforms.



Married Pallet Load



high-liner dock and coupled
pallet



MARKING AND DOCUMENTATION





Build and Document the Pallet

- Secure the load on the pallet using proper tie-down procedures and equipment.
- Weigh each pallet including dunnage that accompanies pallet
- Measure pallet height
- Record pallet height and weight on cargo manifest and pallet identification card



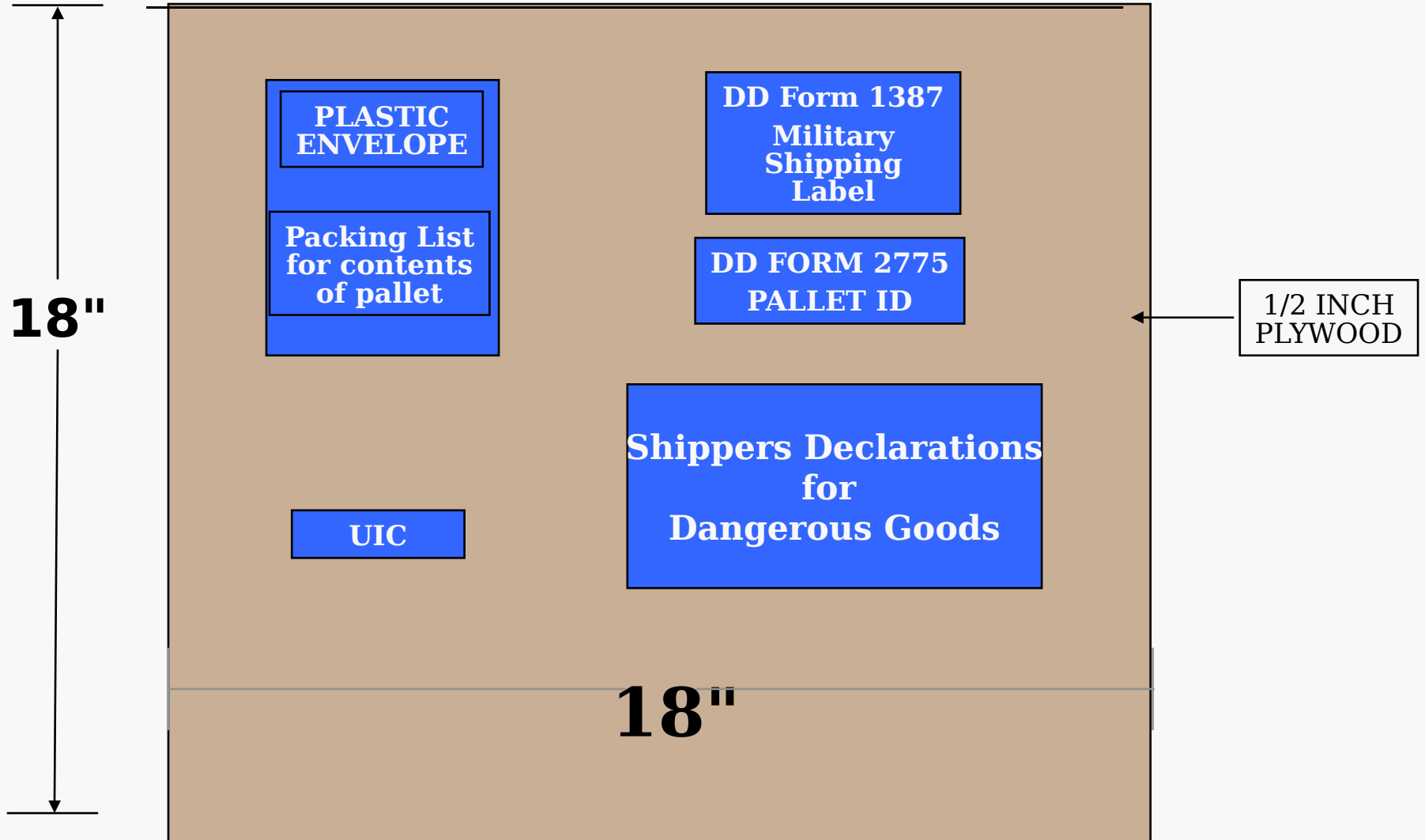


Pallet Board Information



- The information on the pallet board includes
 - A packing list of the shipping containers on the pallet including any hazardous materials
 - The identification and name of the unit
 - Military shipment label and/or RF tag
 - List of points of contact & telephone numbers

463L PALLET IDENTIFICATION



PALLET IDENTIFIER CARD: DD FORM 2775

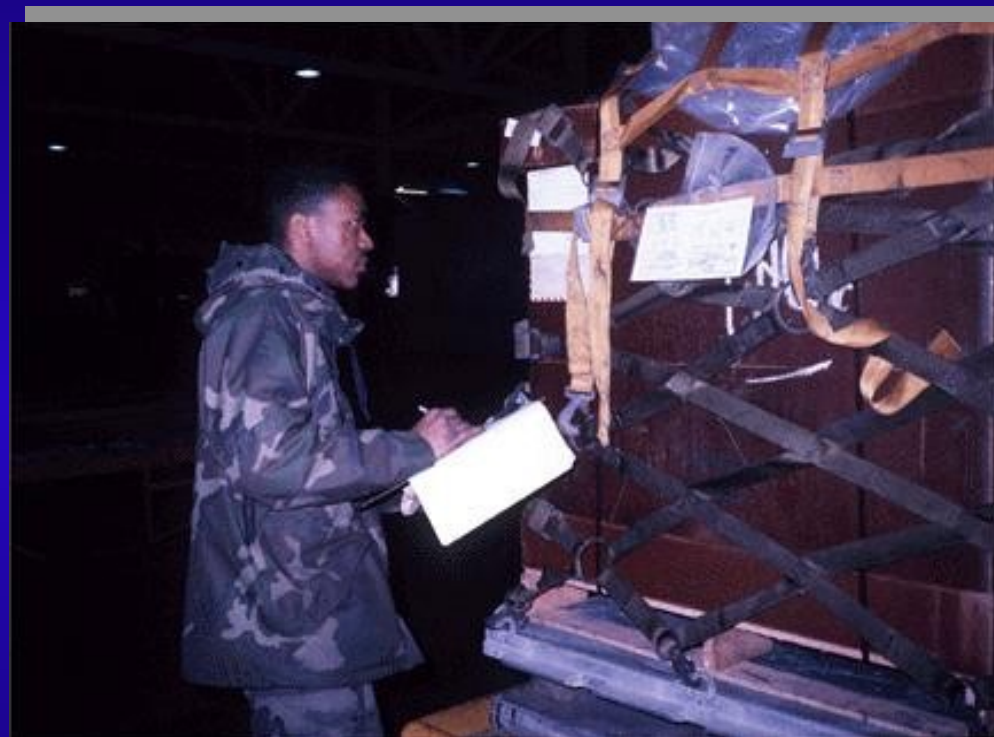
| PALLET IDENTIFIER | | | | |
|--|--|-------------------------------|-----------|------------------------------|
| 1. PALLET IDENTIFICATION NUMBER | | 2. AIRCRAFT CONFIGURATION | | |
| 3. ORIGINATING STATION | | 4. DESTINATION STATION | | |
| 5. NET WEIGHT <i>(Lbs.)</i> | | 6a. STRAPS | b. CHAINS | c. DEVICES |
| | | | | d. NET SETS |
| 7. MISCELLANEOUS INFORMATION/THIS PALLET CONTAINS: | | 8. GROSS WEIGHT <i>(Lbs.)</i> | | |
| | | 9. SCALE WEIGHT CERTIFICATION | | |
| | | a. NAME | b. GRADE | c. DATE <i>(YYYYMMDD)</i> |
| | | 10. CUBE THIS PALLET | | |
| | | | | |
| CARGO | | | | |



Pallet Identifier (DD Form 2775) - Preparation



- Two copies of the pallet identifier (DD Form 2775) will be completed for all 463L pallet/trains loaded with cargo/mail





Pallet Identifier (DD Form 2775) - Preparation



- (cont)
- If the DD Form 2775 is unavailable, a legible substitute can be accepted with the following information, as a minimum:
 - Point of Embarkation (POE)
 - Point of Debarkation (POD)
 - Gross weight
 - Net weight
 - TCN
 - Height



Pallet Identifier (DD Form 2775) - Preparation



- (cont)
- Attach the copies to the upper left hand corner at eye level (when pallet height permits)
 - One on an 88" side and one on a 108" side of the pallet
 - Place the form inside interlocking closure plastic bags for protection
 - Entries on the form are self-explanatory
 - Never reflect words "classified," "small arms/weapons," "munitions," or other highly sensitive items by name



| SHIPPER'S DECLARATION OF DANGEROUS GOODS | | | | | | | | | |
|--|---------------------------|------------------------------------|---------------------------|--|---|---------------|---------------|--|--|
| Shipper ABC Company 1000 High Street Vancouver, Ontario Canada | | | | Air Waybill No. 800 1234 5636 Page 1 of 1 Pages Shipper's Reference Number <small>(optional)</small> | | | | | |
| Consignee CBA Ltd 50 Rue de la Paix Paris 75 006 France | | | | For optional use for Company logo name and address | | | | | |
| Two completed and signed copies of this Declaration must be handed to the operator. | | | | | | | | | |
| TRANSPORT DETAILS | | | | | | | | | |
| This shipment is within the limitations prescribed for: <small>(delete non-applicable)</small> | | | | Airport of Departure Vancouver | | | | | |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">PASSENGER AND CARGO AIRCRAFT</td> <td style="padding: 2px;">CARGO AIRCRAFT ONLY</td> </tr> </table> | | PASSENGER AND CARGO AIRCRAFT | CARGO AIRCRAFT ONLY | | | | | | |
| PASSENGER AND CARGO AIRCRAFT | CARGO AIRCRAFT ONLY | | | | | | | | |
| Airport of Destination Paris, Charles de Gaulle | | | | Shipment type: <small>(delete non-applicable)</small> <div style="border: 1px solid black; padding: 2px; display: inline-block;">NON-RADIOACTIVE INFECTIOUS</div> | | | | | |
| NATURE AND QUANTITY OF DANGEROUS GOODS | | | | | | | | | |
| Dangerous Goods Identification | | | | | | | | | |
| Proper Shipping Name | Class or Division | UN or ID No. | Packing Group | Subsidiary Risk | Quantity and type of packing | Packing Inst. | Authorization | | |
| Nicotine | 6.1 | UN1654 | II | | 1 Steel drum 20 L | 611 | | | |
| Self-reactive solid type V <small>(Bicene Sulfahydride)</small> | 4.1 | UN3226 | II | | 1 Fibreboard box 10 kg | 430 | | | |
| Paint | 3 | UN1263 | II | | 2 Fibreboard boxes 4 L | 305 | | | |
| Waste | 3 | UN1263 | III | | 1 Fibreboard box 30 L | 304 | | | |
| Vehicle (flammable liquid powered) | 9 | UN3166 | | | One motorcycle 1350 kg | 900 | | | |
| Chemical etc. | 9 | UN3166 | II | | 1 Fibreboard box 3 kg | 915 | | | |
| Additional Handling Information The packages containing UN3226 must be shaded from direct sunlight, stored away from all sources of heat in a well ventilated area and not over-stowed with other cargo. | | | | | | | | | |
| I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. | | | | | Name/Title of Signatory B. Smith, Dispatch Supervisor Place and Date Vancouver 1 January 1999 Signature <small>(see instruction above)</small> | | | | |
| | | | | | | | | | |

- Labels must be readily visible to the aircrew during flight
- Hazardous cargo must be accessible to the aircrew at all times

Dunnage



- All pallets are required to be shipped with dunnage (usually wood)
- Dunnage is placed under 463L pallets to prevent damage to the lower pallet surface and to aid in transportation with a forklift
- User is responsible for providing dunnage for both deployment/ redeployment
- Minimum dimensions of each piece of dunnage are 4" x 4" x 88" long
- Use three pieces to support each loaded 463L pallet while on the ground





COMMON ERRORS



- **IMPROPERLY INSTALLED NETS & STRAPS**
- **NOT USING 3-POINT DUNNAGE**
- **EXCEEDING USABLE DIMENSIONS**
- **EXCEEDING HEIGHT RESTRICTIONS**
- **EXCEEDING GROSS WEIGHT RESTRICTIONS**
- **HAZARDOUS CARGO NOT DOCUMENTED OR MARKED PROPERLY; INACCESSIBLE**



SUMMARY



- **FEATURES AND ADVANTAGES**
- **3 ELEMENTS OF 463L CARGO SYSTEM**
- **INSPECTION AND STORAGE PROCEDURES**
- **PALLET RESTRICTIONS**
- **PALLET BUILD-UP**
- **MARKING AND DOCUMENTATION**
- **COMMON ERRORS**